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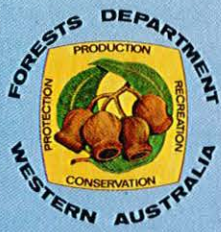
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# FOREST FOCUS

NUMBER 10    APRIL 1973

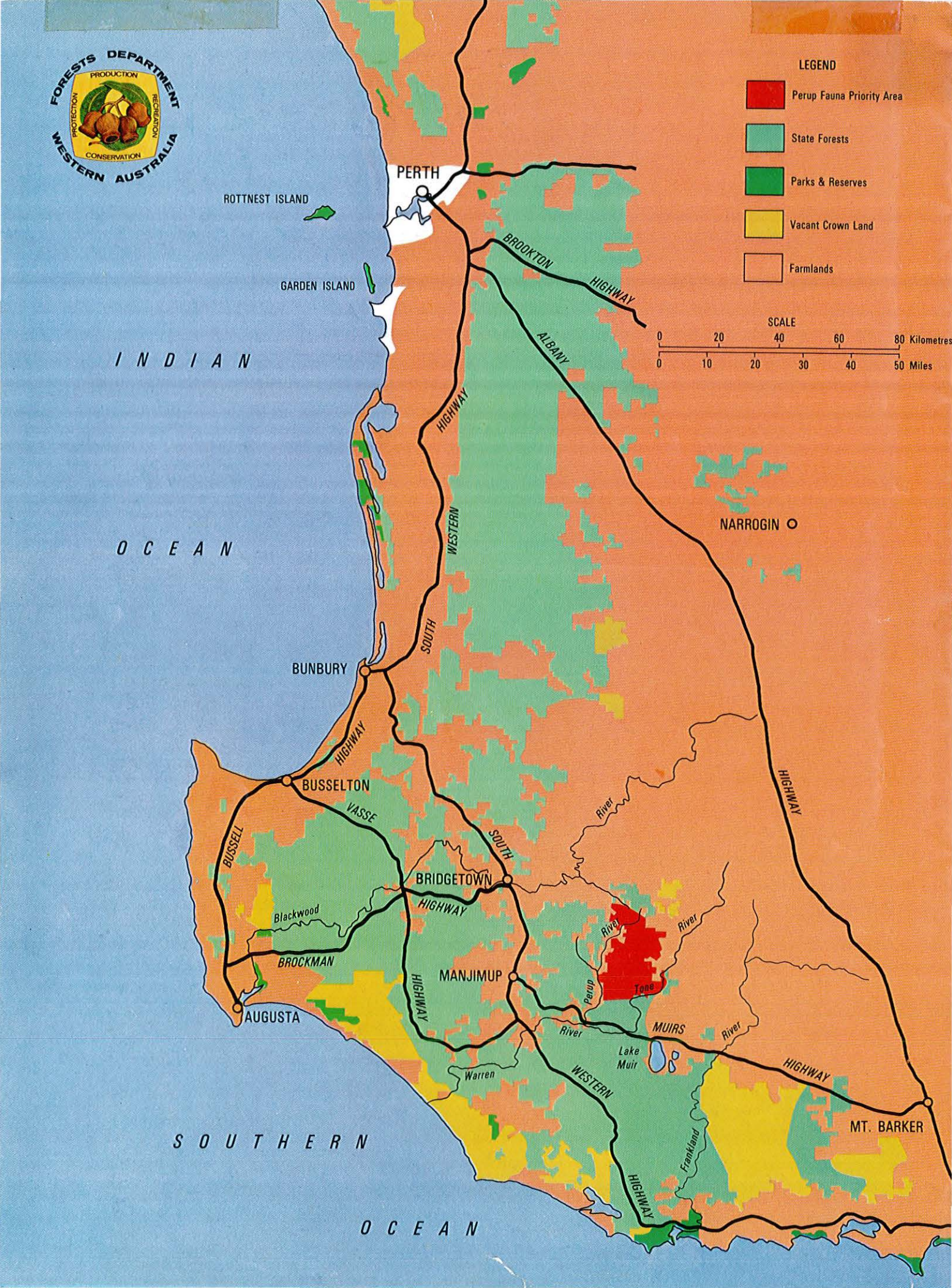
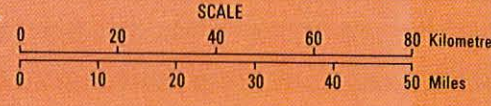






LEGEND

- Perup Fauna Priority Area
- State Forests
- Parks & Reserves
- Vacant Crown Land
- Farmlands



INDIAN OCEAN

OCEAN

SOUTHERN OCEAN

OCEAN

PERTH

ROTTNEST ISLAND

GARDEN ISLAND

BROOKTON HIGHWAY

ALBANY HIGHWAY

WESTERN HIGHWAY

SOUTH WESTERN HIGHWAY

BUNBURY

BUSSELTON

VASSE HIGHWAY

BUSSELL HIGHWAY

BRIDGETOWN

MANJIMUP

AUGUSTA

BROCKMAN HIGHWAY

WARREN RIVER

PERUP RIVER

TOONGAH RIVER

MUIRS RIVER

LAKE MUIR

FRANKLAND RIVER

HIGHWAY

MT. BARKER

NARROGIN





# FOREST FOCUS

Number 10, April 1973



# FOCUS on a new concept in forestry-Fauna Priority Areas



by P. CHRISTENSEN

Published for Mr. B. J. Beggs, Conservator of Forests, Forests Department of Western Australia, 54 Barrack Street, Perth.

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## Front cover

*Ringtail possum (Pseudocheirus peregrinus) mother and young photographed during spotlight survey.*

(Brian Stevenson)

## Back cover

*Crowned snake (Denisonia coronata) found in a dead blackboy (see "Some Ecological Aspects of Jarrah Die-back"—page 11).*

◀ *State Forest and the Perup Fauna Priority area in relation to lower south-west parks and reserves. The Perup area is particularly rich in native fauna—some of which can be seen at the Manjimup Sanctuary.*

(Cartography by Forests Dept., Mapping Branch.)

▶ *Swamps in the area are seasonal, and dry out in the summer. Animals such as the long-necked tortoise hibernate in the dried mud.*

(Brian Stevenson)

In earlier times it was not often realised that the preservation of habitat is basic to conservation and that protection of individuals against killing is not as important as protection of their habitats. In order to preserve the full range of native fauna it is therefore necessary to preserve significant areas of a variety of different habitats.

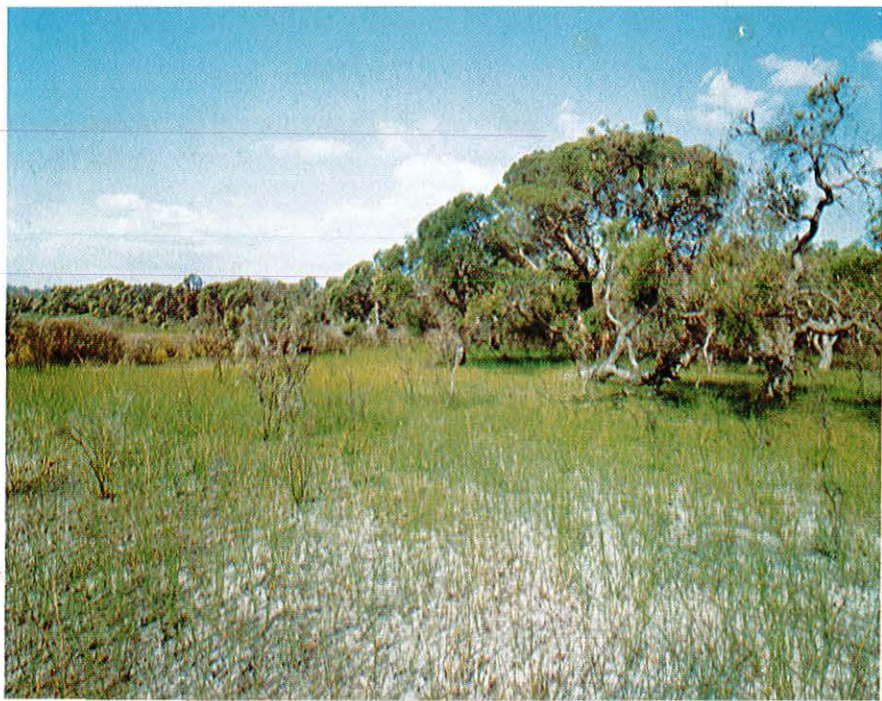
If one studies the fauna of Western Australia it is evident that the various species of animals are not distributed uniformly. Groups of animals characteristic of one place are missing from another. This is because the distribution of animals results from the type of environment available to them, and this is not uniform from place to place. The relationship may be demonstrated by looking at the distribution of animals in relation to climatic factors, for example temperature and rainfall.

In Western Australia there are three main climatic regions: the North-West province with high rainfall during hot summers, the Central province receiving intermittent rainfall in varying amounts, and the

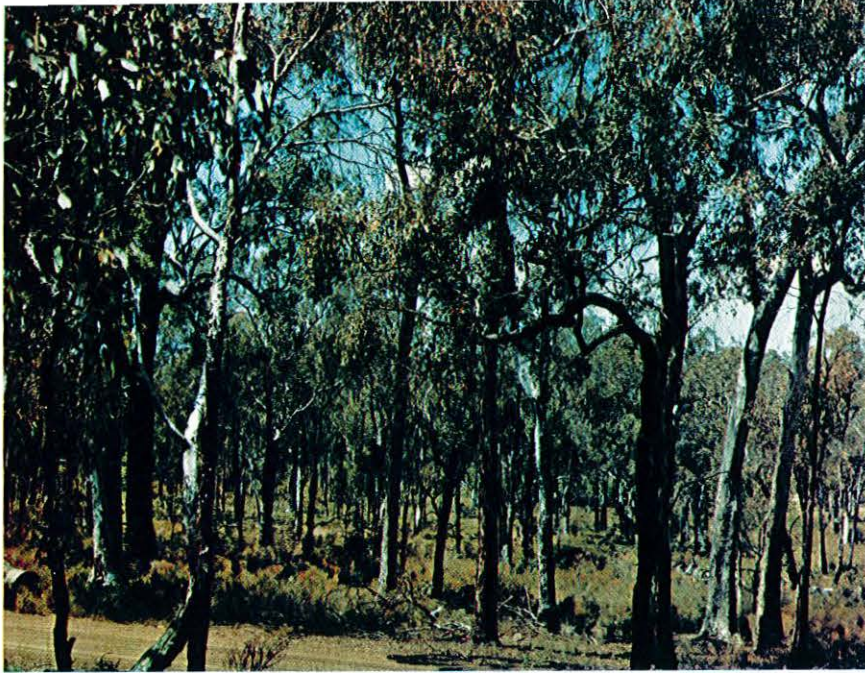
South-West province with its regular high rainfall during cold winters.

The south-west region, although the *smallest in area*, contains a *greater diversity of animals birds and plants* than either of the other two regions.

If one examines the land use map of the south-west region it is plain that in most areas there is very little of the original habitat left. Most of the land has been cleared for farming purposes leaving only isolated pockets of native bush. These pockets of otherwise useless land, usually situated on high rocky outcrops or low swampy areas—land too difficult to farm—have been designated as Flora and Fauna Reserves.







The majority of these reserves, especially in the more populated areas are very small and can serve only a limited purpose in conservation of flora and fauna. The map shows the extent of the major areas reserved as National Parks and Flora and Fauna Reserves, State Forest and unalienated Crown land in the south-west.

By far the largest block of land available for both conservation and recreation is the area of State Forest. Although it represents less than one per cent of this State's total area, the forest areas contain at least 45 of the 126 or so species of mammals known to occur in this State.

Some of the richest fauna areas are the low rainfall temperate forest and woodland formation (i.e. the wandoo forest) and the drier parts of the sclerophyll forest (i.e. jarrah forests). Much of this type of habitat has been destroyed and turned to pasture. Most of that which still exists occurs within State Forest. A large block which is still particularly rich in native fauna occurs between the Perup and Tone Rivers (see map).

This section of State Forest, an area of approximately 100,000 acres, has been set aside as a Fauna Priority area within State Forest.

At least 27 species of mammals occur within the area as well as over 100 different species of birds. It supports what is perhaps the largest population of brush-tailed bettong or woylie (*Bettongia penicillata*) anywhere. The comparatively rare numbat (*Myrmecobius fasciatus*) is also common within the area. On one night-time spotlight survey along a

◀ Top: Typical open wandoo forest. (Brian Stevenson)

◀ Middle: Low open jarrah forest such as this is typical of much of the area. (Brian Stevenson)

◀ Bottom: Heart leaf poison scrub (*Gastrolobium bilobium*). These thickets provide shelter for the scrub wallabies during the day. (Brian Stevenson)





▲ *Woylie, or brush-tailed rat kangaroo (Bettongia penicillata). The Perup area is one of the major strongholds of this species.* (Bert Wells)

▼ *Western brush wallaby (Macropus irma)—a Western Australian species still very common throughout forest areas.*

seven-mile route 109 animals were recorded. This included 49 ringtail possums, 31 grey kangaroos, 12 brush-tail possums, 7 brush-tail wallabies, 6 woylies, 1 native cat, 1 rabbit and 2 unidentified animals, probably possums.

### Little water

The area is gently undulating country dissected by numerous small tributaries of the Perup and Tone Rivers. During the summer months there is little surface water available. Along the entire length of the area the Perup and Tone Rivers are bounded by cleared pasture, with access to the river at only three points. The majority of the swamps within the area are taken up by private property.

The predominant vegetation is jarrah forest, occurring on the lateritic ridges varying from poor class open forest in the east to better class denser forest in the west. The understorey is low and open in the east, often dominated by *Bossiaea*





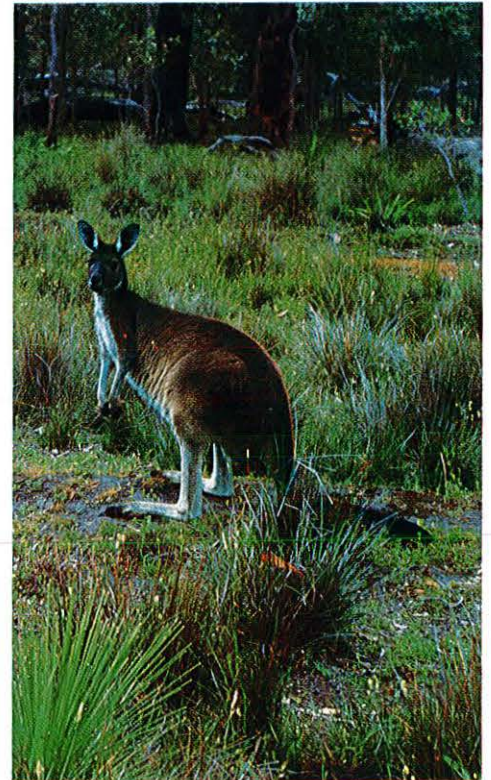


▲ *The tamar (Macropus eugenii). This small wallaby is common in the dense thickets near gullies and creeks.*

▼ *The emu (Dromaius novaehollandiae) occurs throughout the forest areas.*



▼ *Western grey kangaroo (Macropus fuliginosus).*





*ornata*. In the western sector it is denser and *Bossiaea linophylla* is dominant.

On the sandy loams in lower lying areas wandoo woodlands occur. Blackboy flats are common and there are a few granitic outcrops and some *Cladium* swamps present in the southern sector.

### Fire history

The fire history is interesting. Far from having been protected from fires, the area has been burnt frequently in the past. Records dating back as far as 1938 indicate that the area suffered frequent wildfires during the hot dry summer and autumn months. It was common practice for farmers to burn the perimeter of their properties and fires often continued to burn uncontrolled for long periods.

In 1950 an exceptionally severe wildfire swept the entire area leaving the trees scorched and leafless. Prescribed spring burning was started in the late 1950s and the area has been burnt on a five to six year cycle since then.

The entire area has been logged and this has opened up the canopy considerably and in some areas created a secondary canopy of saplings much appreciated by certain species of birds and also the ringtail possums. The more open canopy together with the burning has encouraged the development of scrub in certain areas. Heartleaf poison (*Gastrolobium bilobium*) forms dense thickets, especially in some of the lower lying areas, while *Acacia pulchella* forms thickets on the ridges.

These thickets are the refuge of the woylie and the tammar as well as other animals and they may play an important part in the fauna ecology of the area. It is probable that the poison thickets may be partly responsible for the continued existence of the rich fauna population in the area. They have ensured that otherwise suitable forest has not been used extensively for cattle grazing which



▲ Pool on the Perup River, haunt of the sacred kingfisher. (Brian Stevenson)



▲ *Mardo* (*Antechinus flavipes*). A small predatory marsupial common in south-west forest areas. (Dick Perry)

▼ *Common dunnart* (*Sminthopsis murina*). This little marsupial mouse is frequently found nesting in dead blackboys. (Dick Perry)







would have meant a deterioration of the plant communities resulting in disappearance of the fauna.

The two major objectives in creating a fauna priority area are:

1. *The conservation and management of the total forest environment with particular reference to the fauna.*
2. *To use the area as a centre of research aimed at establishing the basic principles for sound fauna management in forest areas.*

As already mentioned the woylie and the numbat although common within the area are not widely distributed elsewhere. *They are virtually extinct in all states except Western Australia.* Therefore these species particularly, require special treatment so that their continued survival may be ensured. Other more common species will also benefit from fire management.

Professor A. R. Main of the University of Western Australia has demonstrated that for an area to retain the fauna and flora representative of a region without intensive management it should be at least 50,000 acres in extent. This is one reason for the large size of the Fauna Priority area.

However in assuming that an area of this size can sustain itself in its natural state indefinitely, presupposes that it is left entirely to itself under those conditions prevailing prior to the advent of Western man on this continent. Early records reveal that under these conditions, fires lit by lightning strikes or by

◀ *Top: Western native cat (Dasyurus geoffroii) trapped and released during fauna survey operations.*

(David Fauville)

◀ *Middle: Echidna (Tachyglossus aculeatus). This is an animal not commonly observed.*

(Dick Perry)

◀ *Bottom: Quokkas (Setonix brachyurus). Although still fairly common in dense thickets in forest areas, this animal has not been positively identified in this particular area yet.*

(Dick Perry)



aborigines for hunting or other purposes burnt through the forest unchecked during the drier months of the year.

Such fires, burning throughout the dry months would often cover vast tracts of country, being stopped only by natural barriers such as a river or by a change in the weather. Day by day changes together with changing weather conditions would result in a variety of burning intensities.

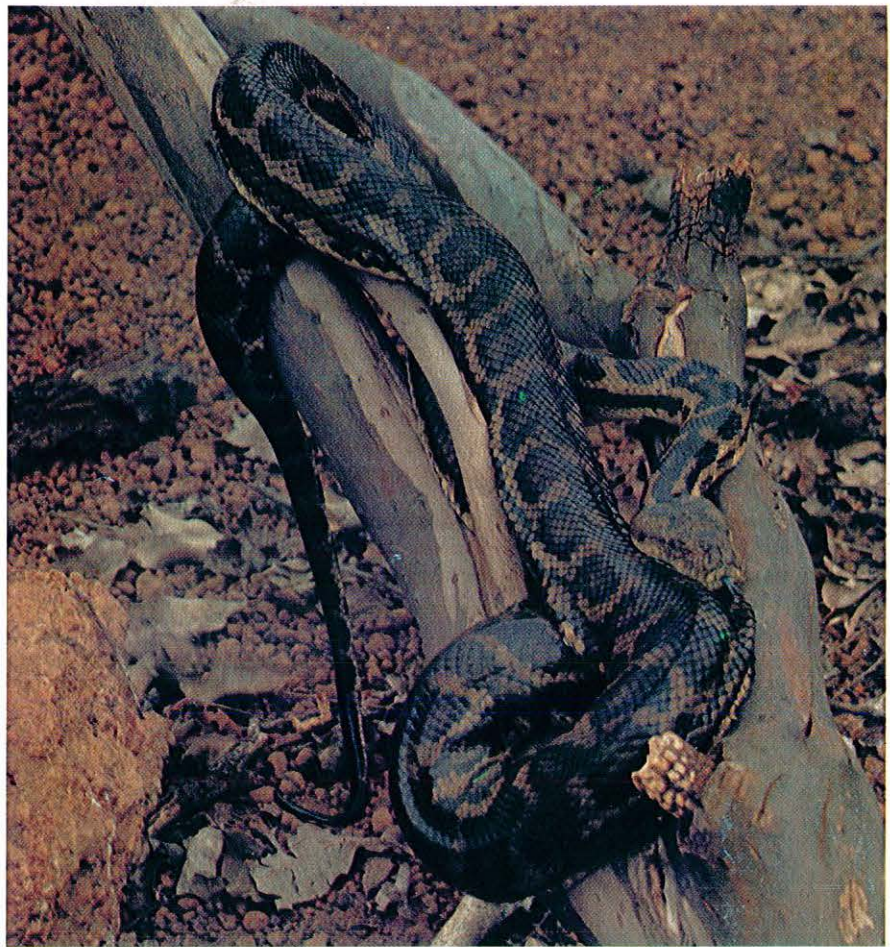
The total effect of this type of fire environment would be a mosaic of burnt and unburnt areas with different scrub communities at all stages of



▲ *Western tiger snake* (*Notechis scutatus occidentalis*). A very dangerous species which prefers damp situations around swamps and creeks.



▲ *Dugite* (*Demansia nuchalis affinis*) — a widely distributed venomous species.



▲ *The carpet snake* (*Morelia variegata*), a non-venomous species. (Brian Stevenson)

▼ *Spotlighting party.* Research officer Christensen and technical assistant Liddelow inspecting female ringtail possums (see front cover) under lights held by technical assistant Leftwich. (Brian Stevenson)





development. This results in a wide variety of habitats which will support a range of fauna.

A certain scrub community will support a different animal population at any given stage of its development. For example, Forest Department research has shown that in the karri forest an area becomes suitable for large grazing animals immediately after fire. Birds such as the western yellow robin (*Eopsaltria griseogularis*), the scarlet robin (*Petroica multicolor*) and the western shrike-thrush (*Colluricincla rufiventris*) also increase in numbers. Later as the understorey develops these species disappear or decrease in numbers and are replaced by thicket-loving species such as the southern bush-rat (*Rattus fuscipes*), the spotted scrub-wren (*Sericornis maculatus*), the red-winged wren (*Malurus elegans*) and the banded blue wren (*Malurus splendens*). Some species of small marsupials such as the common marsupial mouse (*Sminthopsis murina*) prefer areas that have not been burnt for some time.

Other species may require periodic fires of a very high intensity in order to survive. Leadbeaters possum, long believed extinct in Victoria, only increased in numbers following the severe forest fires of 1939. These fires resulted in large acreages of mountain ash (*Eucalyptus regnans*) regrowth, suitable habitat for the species.

Present prescribed burning programmes in Western Australian forests do result in a fair variety of habitats but it may be necessary to extend this in future so that certain areas, at least those especially rich in fauna or flora, receive a more varied fire treatment. The Perup River Fauna Priority area will be a centre of research designed to determine the optimum requirements of various species. Research will be concerned primarily with the use of fire as a management tool and its principal aim will be the development of sound management techniques applicable on an operational scale. (T)



▲ Southern bush rats (*Rattus fuscipes*). This animal is more typical of the karri forest, but occurs in areas of dense undergrowth in the Perup. (Dick Perry)



▲ Quenda, or short-nosed bandicoot (*Isoodon obesulus*). This marsupial frequents areas of dense undergrowth around swamps. (Dick Perry)

▼ Water rat (*Hydromys chrysogaster*) is found in permanent river water holes. (Dick Perry)





# Some Ecological Aspects of Jarrah Dieback

by P. CHRISTENSEN

The destruction of jarrah forest by the jarrah dieback fungus *Phytophthora cinnamomi* has received much publicity. Jarrah is a valuable timber tree and as such it is easily assigned a definite cash value. Therefore, because of a necessity to create a public awareness of the problem as quickly as possible, attention has been directed largely towards this species. This has tended to distract very largely from a less obvious but nonetheless important aspect of the disease, the destruction of a considerable section of the native flora.

Its wide range of host plants makes jarrah dieback very important from an ecological viewpoint. Many plants are affected, notably members of the Proteaceae, Epacridaceae, Myrtaceae and Leguminosae families. Susceptible plants include species of *Banksia*, *Macrozamia*, *Xanthorrhoea*, *Casuarina*, *Dryandra*, *Adenanthos*, *Lomandra*, *Bossiaea*, *Pultenea*, *Leucopogon*, *Podocarpus*, *Kingia*, *Persoo-*

*nia*, *Hibbertia*, *Dasypogon*, *Xylomellum*, *Sterlingia*, and *Conospermum*. All of these are not equally susceptible, they range from the *Banksias* which exhibit almost no resistance to the disease, through *Xanthorrhoea* and *Xylomelum* which show some resistance, to *Hibbertia* and *Casuarina* which appear to have a relatively high degree of resistance.

Most of these species have no obvious direct economic value at present and so unlike jarrah the effects of their destruction are not immediately apparent. Nevertheless in the long term the loss of these components of the native flora may well prove to be of greater significance than the immediate dollar value assigned to the dead timber trees.

▼ *The pigmy possum (Cercartetus concinnus), a tiny insect and nectar feeder often found associated with banksias.*







▲ Dying *Banksia grandis* in forest country.

▼ Dead *Banksia attenuata* on the south coast alongside a newly constructed road.



## Cause for concern

There is cause for concern over the possible eventual extinction of some of the more susceptible species. This in itself is tragic enough since the extinction of any species means the loss of potentially valuable genetic material; but the implications go far beyond the destruction of the individual species. All organisms depend on one another to a greater or lesser degree for their survival, when one species disappears others are affected.

Take for example one of the most interesting and striking genera of plants in Australia, the *Banksias*. There are over 50 species of banksia and with the exception of only one species, which occurs in New Guinea, they are found only in Australia. They are found in all States but occur most abundantly in the west, where there are some 40 endemic species.

Banksias are very important in the ecology of the south-west. Many species flower during late summer and autumn or winter when little else is in bloom, and their pollen and nectar provides food for a whole host of small animals and birds.

For example, the red wattle bird, the little wattle bird, the yellow-winged or new holland honeyeater, together with the closely allied white-cheeked honeyeater, the western spinebill, the tawny-crowned honeyeater, the white-naped honeyeater, and the brown honeyeater are some of the honeyeaters commonly associated with banksia flowers, particularly on the south coast. Other birds such as the silvereye and the black cockatoos also feed on the nectar of the banksia flowers. The latter also frequents the banksia belts at a later date when the seed ripens. Birds come not only to seek nectar but also for the numerous wasps, moths, butterflies, beetles and ants attracted to the flowers. At night the boobook owl and bats feast on moths attracted to the nectar. At this time another small creature the tiny noolbenger or honey possum emerges to feed on the pollen and nectar of the flowers. This animal is almost entirely adapted to a diet of nectar and banksias are one of the main species it frequents.

The equally tiny doormouse or pigmy possum also frequents the banksia groves at flowering time. They live mainly on an insect diet and have been observed to breed at the time of the banksia flowering on the south coast. Their tiny nests and those of the noolbenger are often found inside rotted out hollows in the trunks of the banksia.

The blackboy or grass tree (*Xanthorrhoea preissii*) is another plant of extreme importance in the fauna ecology of the south-west. Whilst it is not nearly as sensitive to dieback as the banksias it can nevertheless suffer considerable mortality on susceptible sites.

The flowering spike attracts many of the previously mentioned honeyeaters and later as the seeds ripen the parrots and cockatoos move in. The mat of hanging dead leaves provides a retreat and nesting sites for small animals, such as marbled geckoes, birds and the tiny pigmy possum.



When the blackboy dies and starts to decay it is attacked by the larvae of the longicorn beetles, the bardee. These and the chafer grubs, also found here in numbers are food for the common marsupial mouse (*Sminthopsis murina*). Incidentally the partially decayed blackboy is one of the favourite nesting places of this animal. They are usually located 3 to 4 ft. from the ground and they use the labyrinth of tunnels initiated by the activities of the grubs. The mardo or yellow-footed marsupial mouse will also shelter in the partially decayed trunks.

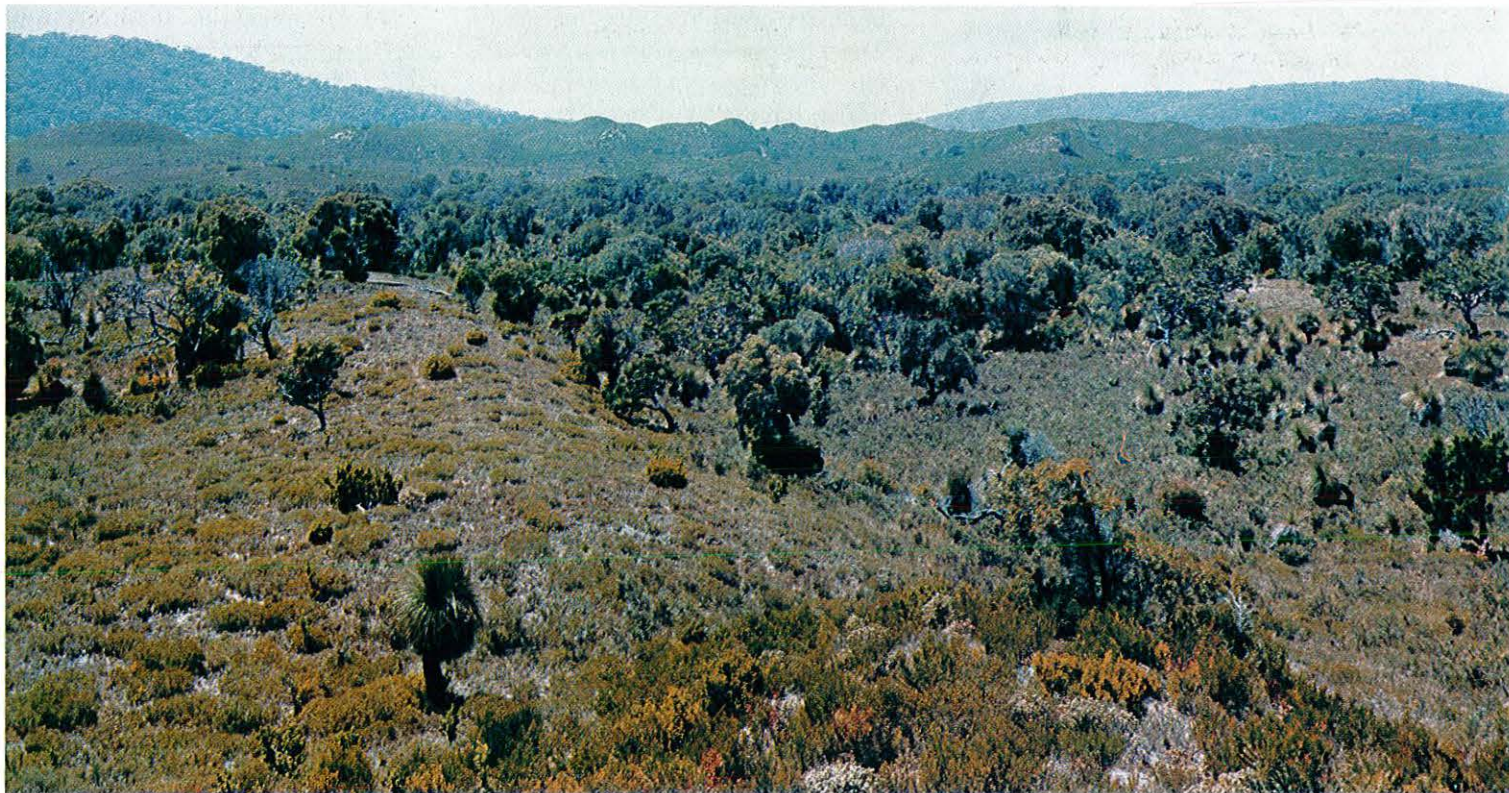
As decay proceeds and the trunk hollows out more, the marsupials vacate the premises and lizards such as Smith's skink and the red-legged skink move in. Small colonies of long-eared bats (*Nyctophilous* sp.) occasionally make a home in the hollow trunks.

A number of snakes are also commonly found in old blackboys. For example, the little whip snake, the crowned snake and the small burrowing worm snake. On the south

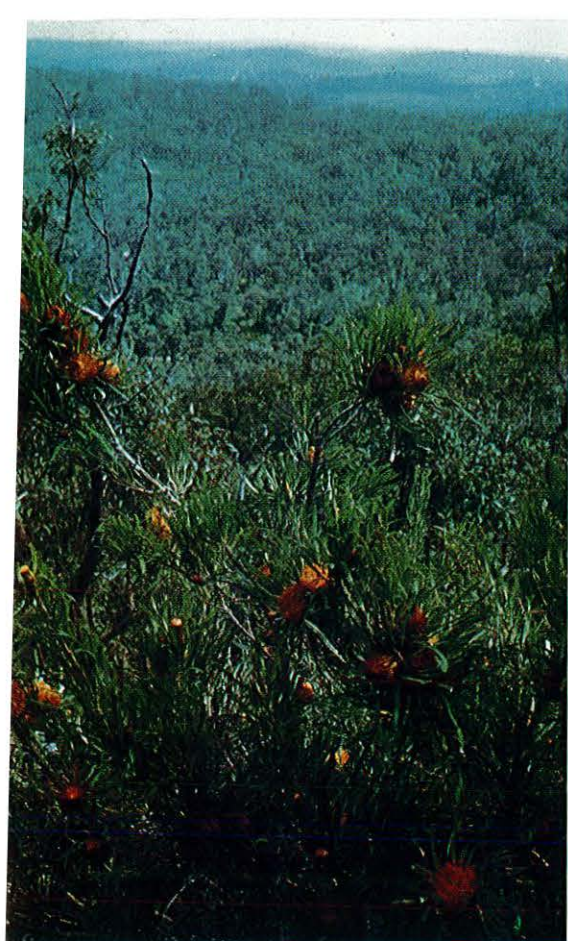


▲ A grove of healthy *Banksia grandis* in jarrah forest. (Brian Stevenson)

▼ *Banksia attenuata* groves on the south coast. Many species of small animals will disappear from this area if dieback kills the banksia.







▲ *Showy dryandra* (*Dryandra formosa*)—a beautiful wildflower susceptible to dieback. (Peter Skinner)

▼ *Banksia littoralis* is another species threatened by dieback.



coastal heath Muellers snake, until recently believed to be very rare, is commonly found in the bases of old decayed blackboys. The blackboy is of special importance in this area as it is often virtually the only shelter present.

These two examples, the banksia and the blackboy, are only a small sample of the many species affected by dieback. Admittedly they are outstanding examples and even if it were these species alone that were threatened the situation would be serious. However, many other species which play a part in the fauna ecology of the south-west are threatened.

The red rind of the *Macrozamia* nut for example is relished by kangaroos, emus and possums alike. Flowering species such as *Dryandra* and *Adenanthos* are frequented by honey-eaters and multitudes of insects, and the fruits of *Podocarpus* are eaten by a variety of birds including the emu.

It is those plant species that are both highly susceptible and grow largely in moister areas, such as swamp edges and gullies, that are in the greatest danger. Many of the banksias come into this category. The bull banksia (*Banksia grandis*) has suffered heavy mortalities especially in the northern forest areas. In the south the swamp banksia (*B. littoralis*) and the river banksia (*B. verticillata*) are suffering.

Left to itself the disease spreads slowly, being dependent on certain conditions of soil moisture and temperature which normally only occur during spring and autumn. Rapid spread is dependent on man's activities. The fungus can be spread in clods of soil adhering to vehicles, plant and equipment when moving from infected to clean areas.

At the present time no economically feasible method of control exists. However research has indicated that the rate of spread of the disease can be drastically reduced by fairly simple hygiene measures. Areas of forest are classified according to severity of infestation and treated accordingly. Severely infected areas are clear felled and planted with resistant species of trees. Special attention is paid to the location of access routes when logging dieback areas. Roads are designed to limit the distance travelled on soft muddy ground which might be picked up by vehicles moving through the area. Plant and machinery are also washed down and sterilised before moving from an infected area to a clean one.

At the present time there is reason to believe that these hygiene measures are having a considerable effect on the rate of spread of the disease within State Forest.

These are only some of the precautions taken against further spreading





of the disease. Lists of detailed instructions exist which must be adhered to by all organisations operating within State Forest areas. However, there is reason to be concerned about other areas such as private land, various categories of reserves and Crown land. Of particular concern are the large tracts of Crown land which exist along the south and south-west coastal areas. At present these are largely wilderness areas visited only by the occasional week-end fisherman. This will inevitably change, sections will be opened up for recreation, townsites may be planned and scenic drives and native trails will be constructed.

Such developments are always preceded by the activity of heavy earth-moving equipment, and could spell disaster for many native species unless strict hygiene measures are adhered to.

There are also many areas on both private land and in parks and reserves where susceptible species exist that have not yet become infected. Such areas should be guarded with the utmost care as once they have been lost they can never again be retrieved. (1)

► *Top: New Holland honeyeater (Phylidonyris novaehollandiae) on parrot-bush (Dryandra sessilis).*  
(Bert Wells)

► *Middle: Red wattle-bird (Anthochaera carunculata) with young. This is a honey and insect eater associated with banksias and other wildflowers.*  
(Bert Wells)

► *Bottom: Honey possum (Tarsipes spencerae) on kangaroo paw (Anigozanthos flavida). This species feeds on the nectar and pollen of banksias and other wildflowers.* (Dick Perry)

◀ *Scarlet banksia (Banksia coccinea) —one of our most spectacular wildflowers—is also susceptible to dieback.*

#### Back Cover

*Crowned snake (Denisonia coronata) found in a dead blackboy.*





